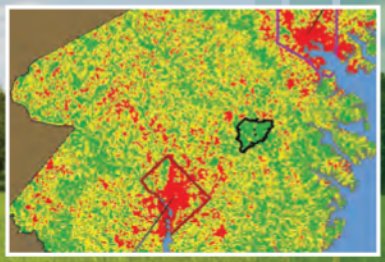
National Aeronautics and Space Administration



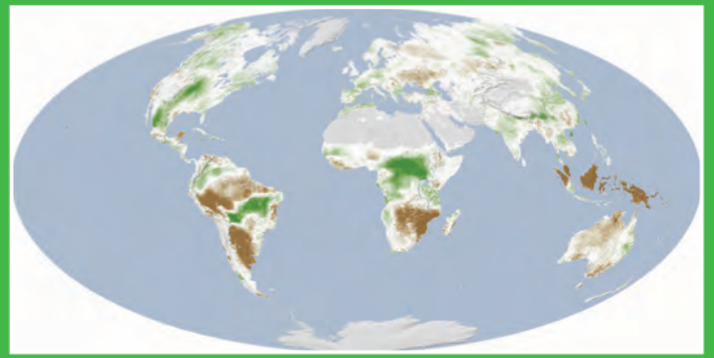
DEVELOP National Program

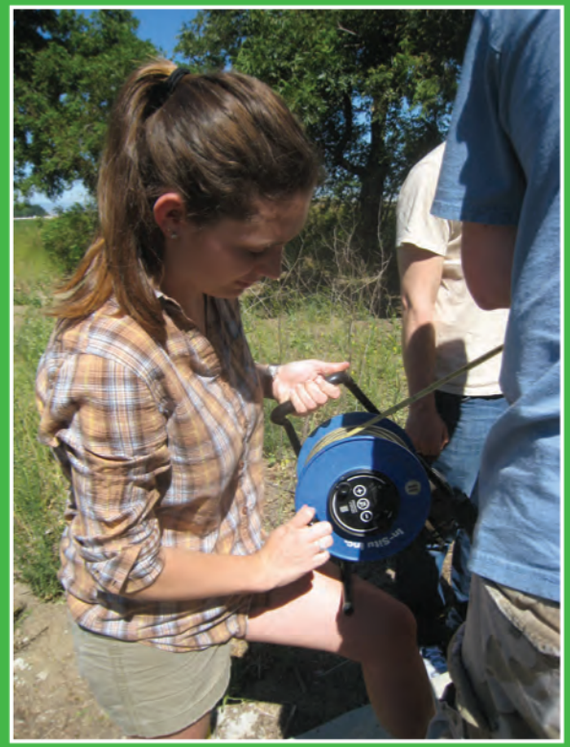
AGRICULTURE

Midwest Agriculture and Climate

Monitoring Operations of Tillage Practices in the Midwest United States

Remote sensing has been used in agriculture for decades to monitor land use, crops, and farming practices. In the wake of climate change and greenhouse gas levels increasing in the atmosphere, monitoring tilling practices has become more important. In the United States, 8 percent of greenhouse gas emissions are related to agricultural processes. Conventional, or intensive, tilling is known to release carbon from the soil into the atmosphere by reducing nutrients in the soil. Conservation tilling has a more positive impact on the environment and can sequester carbon from the atmosphere, creating a carbon sink rather than a carbon source. Farmers can successfully prepare their fields through conservation tilling, which leaves crop residue in the soil to provide nutrients, and reduce water runoff and erosion. Detecting which fields are prepared by conservation tilling practices has been tedious and costly. Utilizing remote sensing capabilities can create an efficient process for monitoring tilling practices. This project focuses on the use of the Hyperion remote sensor for its high spectral resolution. To thoroughly investigate the practicality of using Hyperion data, imagery from Landsat, Advanced Land Imager, and Advanced Spaceborne Thermal Emission and Reflection Radiometer sensors was also analyzed. The final product aims to utilize multiple Hyperion agricultural indices to formulate a new index solely for tillage practice comparisons that could benefit the U.S. Department of Agriculture, the Conservation Technology Information Center, and similar organizations.





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NASA Center DEVELOP Contacts

DEVELOP National Program Office:
Michael Ruiz
NASA Langley Research Center
Hampton, VA

NASA Ames Research Center: Jay Skiles, Ph.D.
Moffett Field, CA

NASA Goddard Space Flight Center: Fritz Policelli
Greenbelt, MD

Jet Propulsion Laboratory: Ben Holt
Pasadena, CA

NASA Marshall Space Flight Center: Jeffrey Luvall, Ph.D.
Huntsville, AL

NASA Stennis Space Center: Cheri Miller
Stennis Space Center, MS

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